TOTALPAC2 Integrated Fire Protection System

Cycling Wet Pipe Systems

General

1. Applicable Standards

The ***TOTALPAC2*** complies with the following standards:

- NFPA-13 Sprinkler Systems;
- NFPA-15 Water Spray Fixed Systems;
- NFPA-16 Foam-Water Deluge and Foam-Water Spray Systems;
- NFPA-72 Fire Alarm Systems.

Before the installation, the contractor installing the unit shall be familiar with the following documents and standards:

- Applicable Local & State Building Codes
- Any additional requirements of the Local Authority Having Jurisdiction.

2. Listings and Approvals

In addition to being fabricated under tight ISO-9001 manufacturing and quality control procedures, your ***TOTALPAC2*** Unit has also been tested and approved by recognized laboratories. Here is the list of Listings & Approvals it meets:

- Underwriters Laboratories Inc. (UL): Cycling Wet Pipe TotalPac2 systems are UL Listed under "Special System Water Control Valves - Assembled Units, category # VKYL.EX4641".
- Factory Mutual Research <FM>: Cycling Wet Pipe ***TOTALPAC2*** systems are FM Approved under the heading: "Automatic Water Control Valves" when installed with specific components.
- NYC-MEA: Cycling Wet Pipe ***TOTALPAC2*** systems are MEA Approved under New-York City's Fire Dept. Information Bulletin # 1-92 under section MEA 89-92-E, Vol. XXVI.

Note: Although most ***TOTALPAC2*** units are Listed, custom built units are sometimes supplied on request. Components in these special units maintain their individual Listings/Approvals but the units are not Listed as an assembled unit.

CAUTION ! Any unauthorized modification or addition made on-site to a factory built Listed Unit will void this Listing. Such modifications or additions may void the unit's warranty as well. Consult your nearest FireFlex Systems Authorized Distributor before proceeding with such modifications or additions.

3. Environment

TOTALPAC2 units shall be installed in a dry and clean location. Verify that all equipment is properly heated and protected to prevent freezing and physical damage.

The unit and it's components must be kept free of foreign matter, freezing conditions, corrosive atmospheres, contaminated water supplies, and any condition that could impair its operation or damage the components.

The frequency of the inspections and maintenance will vary depending on these environmental conditions. The owner is responsible for maintaining the fire protection system and devices in proper operating condition.

Refer to CONFIGURATION DESCRIPTION for maintenance instructions.

4. General Description

There are various types of wet pipe systems, all of them using closed automatic sprinklers in the sprinkler piping.

This ***TOTALPAC2*** integrated fire protection system by *FireFlex Systems Inc*. consists of a cycling wet pipe system trim totally pre-assembled, pre-wired and factory tested. All electrical and mechanical components of the system are contained in one single unit.

The only connections required for installation are the water supply inlet, water discharge outlet, main drain, and the electrical detection and alarm connections. The discharge outlet is connected to a fixed piping system of automatic sprinklers. Water is the extinguishing agent.

Wet pipe systems are usually supervised. The ***TOTALPAC2*** system is completely supervised in order to monitor its integrity. The sprinkler piping is supervised by the water. If there is a leak on the system or if a sprinkler head is accidentally broken, an audible signal will sound.

Electrical detectors and associated wiring are also supervised.

The most common applications are any structure not subject to freezing, to automatically protect the structure, contents and/or personnel from loss due to fire. The structure must be substantial enough to support the piping system filled with water.

Using water as the extinguishing agent, one wet pipe system can cover as much as 52,000 square feet in a single fire area. Small unheated areas of a building may be protected by a wet system if an antifreeze-loop or auxiliary dry system is installed. For rules and limitations, see appropriate codes and standards.

Systems should be designed by qualified fire-protection engineers in conjunction with the appropriate Authority Having Jurisdiction.

Note: Each ***TOTALPAC2*** Unit is identified with it's unique Serial Number. This number is located on a sticker inside the main door panel and is used to maintain a record in our computerized data base. Have this Serial Number handy when calling for information on your unit (format is TOT#####).

5. Features

The ***TOTALPAC2*** unit is superior than many other products available on the market now and has been manufactured by the company that has introduced and developed the concept of integrated fire protection systems in the market.

Main features are:

- Trouble free design for safe and easy application
- Cycling trim available in 5 sizes from 1½" to 6" diameter
- Uses the Viking Flow Control Valves
- Integrated Control Panel

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Cycling Wet Pipe Systems

- Compact, aesthetic and easy to move
- User-friendly standardized owner's manual with every unit
- Unique serial number on every unit
- Uses only UL, ULC Listed and FM Approved components
- Designed in accordance with NFPA Standards
- Trim is fully assembled and tested at the factory
- Water supply and drain connections on both sides, available both with grooved end or flanged fittings
- Sturdy 14 Gauge steel cabinet painted fire red with oven baked polyester powder on phosphate base
- Textured rust proof finish
- Neoprene gasket on all doors to eliminate vibrations
- Easily removable doors for ease of access
- Key-alike locks on all cabinet doors
- Manufactured under ISO-9001 quality control procedures.

Configurations Description

A wet pipe system is a fixed fire-protection system using piping filled with pressurized water, supplied from a dependable source. Closed heat sensitive automatic sprinklers spaced and located in accordance with recognized installation standards are used to detect a fire. Upon operation the sprinklers discharge water over a specific area to control or extinguish the fire. As the water flows through the system an alarm is activated to indicate the system is operating. Only those sprinklers immediately over or adjacent to the fire operate, minimizing water damage.

TOTALPAC2 Cycling Wet Pipe systems are built around the Viking trim using Flow Control Valves Model H-3 for 1½" (40 mm) diameter (Model H-4 is the Halar® Coated version for use in corrosive environments) and Model H-1 for 2" (50 mm) diameter and up (Model H-2 is the Halar® Coated version for use in corrosive environments). The valves are rated up to a maximum of 250 psi WWP (1724 kPa) and are available in the following diameters:

☐ 1½" (40 mm) ☐ 2" (50 mm)

☐ 3" (80 mm) ☐ 4" (100 mm) ☐ 6" (150 mm)

Cycling ***TOTALPAC2*** Wet Pipe systems are supplied with a flange–groove Flow Control Valve. Units with a flange–flange Valve are also available on request.

Release System

The Viking Firecycle® III cycling wet pipe system utilizes a Viking Flow Control Valve *(A2)* in lieu of the Alarm Check Valve and a Firecycle® III Model E-2 Control Panel, together with additional valves, devices and trim to form a unique operating system.

In addition to automatically detecting a fire and turning the system on, Firecycle® III has the added ability to sense when the fire has been controlled, and automatically turn off the water flow once a preprogrammed "Soak Timer" has been satisfied. Should the fire rekindle, the Firecycle® III will initiate the sequence again. This unique cycling feature will repeat as long as power is available to the panel, helping to minimize water usage, water damage, and the danger of pollution to surrounding areas. Firecycle® III systems are also "Fail-Safe".

Note: ***TOTALPAC2*** Firecycle® III Systems are available with electrical type release and the integrated Firecycle® III Model E-2 Control panel.

The Firecycle® III Cycling System has several "Fail-Safe" features, some of which are not available on other wet pipe systems. Refer to SYSTEM OPERATION for more details.

Installation

TOTALPAC2 Units must be installed in an area not subject to freezing temperatures or physical damage.

1. Install the ***TOTALPAC2*** unit and connect the system according to instruction manual and technical data supplied.

Note: The drain collector shall be connected to an open drain. Do not restrict or reduce drain piping.

2. Install the automatic sprinkler piping, detection and signaling circuits in accordance with applicable NFPA standards.
3. Conform to local municipal or other codes regarding installations of fire protection systems.
4. Perform preliminary inspection outlined below prior to putting system in service.
5. Put the system into operation as outlined below.

Perform the annual inspection sequence and test each detector and alarm unit (if applicable).

6. If the system does not operate as it should, make the necessary corrections according to manuals issued or consult your distributor or *FireFlex Systems Inc*.
7. Make sure that building owner or a delegated representative has received instructions regarding the operation of the system.

Preliminary inspection before placing the system in service

1. Open door to mechanical section. Main Water Supply Control Valve *(D1)* should be CLOSED. Alarm test valve *(B5)* must be CLOSED. All gauges *(B11 and B12)* should show 0 psi pressure.
2. OPEN Emergency Release Valve *(B10),* then Main Water Supply Control Valve *(D1).*
3. Using the built-in contractor's hydrostatic test port (see TRIM SCHEMATIC for location) once the sprinkler system is filled with water, maintain a pressure of 200 psi for 2 hours. Correct leaks if any before completing test.
4. Connect all detection and alarm audible devices according to electrical schematics (see TBA field wiring diagram in PROGRAMMING SECTION).

Note: For proper operation of the wet system and to minimize unwanted (false) alarms, it is important to remove trapped air from the system when filling it with water. Air trapped in the system may also cause intermittent operation of the water motor alarm during sustained flow of water (such as the flow required by an open sprinkler or the system test

valve). Consider installation of auxiliary vents to facilitate venting.

Placing the system in service

(Refer to mechanical trim description and TRIM SCHEMATIC)

All initiating devices (detectors), indicating appliances and releasing devices must be compatible and approved for use with the Firecycle® III System. Refer to CONTROLS SECTION for the list of compatible devices.

1. Verify that the system has been properly tested. Emergency Release Valve *(B10)* should be OPEN.
2. SLOWLY OPEN and secure the system Main Water Supply Control Valve *(D1)*. Consider venting any trapped air in the system.
3. CLOSE the Emergency Release Valve *(B10)*.
4. Verify that the Alarm Test Valve *(B5)* is CLOSED and that all other valves are in their "normal" operating position (Refer to TRIM SCHEMATIC for details).
5. Open Firecycle® III control Panel and press "RESET". Release solenoid valve *(F1)* should open.
6. On new installations, systems that have been placed out of service, or where new equipment has been installed, trip test system to verify that all equipment functions properly. Refer to MAINTENANCE – ANNUALLY for instructions.
7. After completing the trip test, perform MAINTENANCE – SEMI-ANNUALLY.

Note: When a valve has been removed from service and is subject to freezing or will be out of service for an extended period of time, all water must be removed from the priming chamber, trim piping, water supply piping and any other trapped areas.

Mechanical Trim Section

1. System Operation

In the SET condition:

System water supply pressure enters the priming chamber of the Flow Control Valve *(A2)* through the ¼" (8mm) priming line which includes a strainer *(B2)*, a restricted orifice *(B3)* and a spring check valve *(B4)*. Normally open solenoid valve *(F1)* allows priming water to escape so that the Flow Control Valve *(A2)* will not set, but remain open, filling the system with water.

In a fire condition:

In a fire condition, when the detection system operates, system Control Panel activates an alarm and energizes normally closed Solenoid valve *(F2)* open and normally open Solenoid valve *(F1)* closed.

Pressure is released from the priming chamber to open drain manifold faster than it is supplied through the restricted orifice *(B3)*. The Flow Control Valve *(A2)* clapper remains fully open to allow water to flow into the system piping and activate alarm devices, including a water flow Alarm Pressure Switch *(C1)*.

Water will immediately flow from any sprinklers which may have operated. Water Flow Alarm Switch *(C1)* activates, latching normally open solenoid valve *(F1)* closed. Water discharges until all Firecycle Detectors have reset (cooled below their set point). After all detectors have reset, the control panel activates the "Soak Timer" allowing the system to continue discharging water for a preset time period.

When the Soaking Timer has expired, the control panel de-energizes normally closed Release Solenoid Valve *(F2)*, allowing it to close. (The normally open Release Solenoid Valve *(F1)* remains energized closed until the control panel is manually reset, or both the AC power and battery backup have failed).

The Flow Control Valve *(A2)* re-primes and closes, stopping the flow of water through the system piping.

Should a Firecycle® detector go into alarm at this time, the control panel re-energizes normally closed release Solenoid valve *(F2)* open, and the entire cycle repeats.

Trouble conditions:

- False alarms – If water pressure surges produce false alarms check if air is trapped in the sprinkler piping. Trapped air can cause false alarms, the alarms to cycle on and off during testing and other nuisance problems. To correct bleed as much air as possible from the trapped high points of system piping. This condition can be minimized by opening the remote inspectors test valve and slowly filling the system with water when placing the system in service.

If the detection system is damaged or malfunctions, the Firecycle® III Control panel will go into alarm and the flow control valve will open. Water will not flow from any sprinklers until a sprinkler has operated, as in a fire. The cycling function of the Firecycle III® will not operate in this condition and the system must be manually shutoff. All alarms will operate normally.

If the piping system is damaged sufficiently to activate the Water Flow Alarm Switch *(C1)*, the control Panel will energize normally open Release Solenoid Valve *(F1)* closed. Because a detector has not gone into alarm mode, release Solenoid Valve *(F2)* will remain non-energized closed. The Flow Control valve *(A2)* will re-prime and close after a short delay. This feature ensures that should a sprinkler or the system piping become damaged, the amount of water which will discharge is limited by the system pressure and the location of the system damage.

Should a Firecycle® detector detect a fire during this condition, normally closed Release Solenoid valve *(F2)* will be energized open, allowing the Flow Control valve *(A2)* to open, and water will be discharged from any sprinklers which may have operated as a result of the fire, as well as from the damaged portion of the system and all alarms will operate normally in this condition.

If the AC power fails, the Firecycle® III System continues to operate on the standby batteries. Should both AC and

batteries fail prior to the operation of the system, all alarms will be lost but the system will fail-safe and operate like a standard wet pipe system.

The cycling function of the system will not operate in this condition, and the system must be manually shut-off.

If power fails while the system is flowing water, the system will not cycle off and must also be manually shut-off.

2. Emergency Instructions (refer to piping diagram provided)

To take system Out of Service:

WARNING ! Placing a control valve or detection system out of service may eliminate the Fire Protection capabilities of the system. Prior to proceeding, notify all Authorities Having Jurisdiction. Consideration should be given to employ a fire patrol in the affected areas.

After a fire, verify that the fire is OUT and that placing the system out of service has been authorized by the appropriate Authority Having Jurisdiction.

.1 Close Water Supply Control Valve *(D1)*.

.2 Open system Main Drain Valve *(D3)* and inspectors test valve. Drain the system piping.

.3 Silence alarms (refer to CONTROL PANEL SECTION for additional details).

Note: Electric alarms controlled by a pressure switch *(C2)* installed in the ½" (15mm) NPT connection for a Non-interruptible Alarm Pressure Switch cannot be shut-off until the Flow Control Valve is reset or taken out of service.

Sprinkler systems that have been subjected to a fire must be returned to service as soon as possible. The entire system must be inspected for damage, and repaired or replaced as necessary.

.4 Replace any detectors or sprinkler heads that have been damaged, or have been exposed to fire conditions.

.5 Perform all maintenance procedures recommended in MAINTENANCE, describing individual components of the system that has operated.

.6 Return the system to service as soon as possible. Refer to PLACING THE SYSTEM BACK IN SERVICE.

3. Placing the system back in service
(refer to TRIM SCHEMATIC)

Note: For additional details, refer to instructions provided in the Viking Data Book describing the Flow Control Valve, and other system components.

When the wet pipe system is ready to be placed in service, verify that all the equipment is adequately heated and protected to prevent freezing and physical damage.

Note: For proper operation of the wet system and to minimize unwanted (false) alarms, it is important to remove trapped air from the system when filling it with water. Air trapped in the system may also cause intermittent operation of the water motor gong during a sustained flow of water (such as the flow required by an open sprinkler or the system test valve). Consider installation of auxiliary vents to facilitate venting.

CAUTION: Opening of the water supply main control valve *(A2)* will result in water flow from any openings in the system.

1. Slowly open the Emergency Release *(B10)* to allow the system pressure to return to normal.
2. Once the pressure has stabilized, close the Emergency Release *(B10)* and press the "System Reset" button on the Firecycle® III Control Panel.

Trouble conditions:

Inspections & Tests

It is imperative that the system be inspected on a regular basis. Refer to INSPECTIONS and TESTS recommended in current Viking technical Data describing individual components of the Viking Wet pipe System used.

The frequency of the inspections may vary due to contaminated water supplies, corrosive or humid atmospheres as well as the condition of the air supply to the system. In addition to the instructions herewith, local Authority Having Jurisdiction may have additional maintenance, testing and inspection requirements which must be followed.

WARNING ! Any system maintenance which involves placing a control valve or detection system out of service may eliminate the fire protection capabilities of that system. Prior to proceeding, notify all Authorities Having Jurisdiction. Consideration should be given to employment of a fire patrol in the affected areas.

Maintenance

Note: The owner is responsible for maintaining the fire protection system and devices in proper operating condition.

For additional information, refer to MAINTENANCE INSTRUCTIONS provided in current Viking Technical Data describing individual components of the Viking Preaction System used.

Where difficulty in performance is experienced, the valve manufacturer or his authorized representative shall be contacted if any field adjustment is to be made.

The following requirements are based upon NFPA-25:

Records.

Records of inspections, tests, and maintenance of the system and its components shall be made available to the authority having jurisdiction upon request. Typical records include, but are not limited to, valve inspections; flow, drain, and pump tests; and trip tests of Flow Control valves.

Acceptance test records should be retained for the life of the system or its special components. Subsequent test records should be retained for a period of 1 year after the next test.

Cycling Wet Pipe Systems

The comparison determines deterioration of system performance or condition and the need for further testing or maintenance.

Monthly:

.1 Inspection of gauges (water supply and system pressure) to ensure good condition and normal water supply pressure.

.2 Flow Control valve shall be externally inspected. The valve inspection shall verify the following:

a. The gauges indicate normal supply water pressure is being maintained.
b. The valve is free of physical damage.
c. All valves are in the appropriate open or closed position.
d. There is no leakage from the alarm drains.

Quarterly:

- Alarm Device (pressure or flow switch). (**Testing by opening the inspector's test connection**)
- Main Drain Test (Riser Flow Test) to determine if change in water supply or control valve position.

Test procedure:

- Record the pressure indicated by the supply water gauge.
- Fully open the main drain valve.
- Record residual pressure.
- Close the main drain valve slowly.
- Record the time taken for supply water pressure to return to the original pressure.
- Open the alarm control valve

Semi-Annually:

- Valve supervisory switch shall be tested to verify the operation of the switch upon movement of the hand wheel.

Annually:

- Manual Pull station test.
- Record indicating the date of the last trip, tripping time and name of organization conducting the test shall be maintained at a location available for review by the Authority Having Jurisdiction.

Every 5 years:

- Alarm valve and associated strainers, restriction orifice, gaskets, moving parts shall be inspected internally.
- Test on gauge (gauge precision required: less than 3% of the full scale)
- Test on control valves operation

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Cycling Wet Pipe Systems